Policy, Politics, and Collective Action

Understanding Evidence-Based Public Health Policy

Ross C. Brownson, PhD, Jamie F. Chriqui, PhD, and Katherine A. Stamatakis, PhD, MPH

Public health policy has a profound impact on health status. Missing from the literature is a clear articulation of the definition of evidence-based policy and approaches to move the field forward. Policy-relevant evidence includes both quantitative (e.g., epidemiological) and qualitative information (e.g., narrative accounts).

We describe 3 key domains of evidence-based policy: (1) *process*, to understand approaches to enhance the likelihood of policy adoption; (2) *content*, to identify specific policy elements that are likely to be effective; and (3) *outcomes*, to document the potential impact of policy.

Actions to further evidence-based policy include preparing and communicating data more effectively, using existing analytic tools more effectively, conducting policy surveillance, and tracking outcomes with different types of evidence. (*Am J Public Health.* 2009;99:1576–1583. doi:10.2105/AJPH.2008.156224)

IT HAS LONG BEEN KNOWN that public health policy, in the form of laws, regulations, and guidelines, has a profound effect on health status. For example, in a review of the 10 great public health achievements of the 20th century,[1] each of them was influenced by policy change such as seat belt laws or regulations governing permissible workplace exposures. As with any decision-making process in public health practice, formulation of health policies is complex and depends on a variety of scientific, economic, social, and political forces.[2]

There is a considerable gap between what research shows is effective and the policies that are enacted and enforced. The definition of policy is often broad, including laws, regulations, and judicial decrees as well as agency guidelines and budget priorities.[2–4] In a systematic search of "model" public health laws (i.e., a public health law or private policy that is publicly recommended by at least 1 organization for adoption by government bodies or by specified private entities), Hartsfield et al.[5] identified 107 model public health laws, covering 16 topics. The most common model laws were for tobacco control, injury prevention, and school health, whereas the least commonly covered topics included hearing, heart disease prevention, public health infrastructure, and rabies control. In only 6.5% of the model laws did the sponsors provide details showing that the law was based on scientific information (e.g., research-based guidelines).

Research is most likely to influence policy development through an extended process of communication and interaction.[6] In part, the research–policy interface is made more complex by the nature of scientific information, which is often vast, uneven in quality, and inaccessible to policymakers. Several models for how research influences policymaking have been described,[7–9] most of which involve moving beyond a simple linear model to more nuanced and indirect routes of influence, as in gradual "enlightenment."[10] Such nonlinear models of policymaking and decision-making take into consideration that research evidence may hold equal, or even less importance, than other factors that ultimately influence policy, such as policymakers' values and competing sources of information, including anecdotes and personal experience.[11] Although not exhaustive, Table 1 highlights several important barriers that should be considered when one is attempting to develop effective policy.[12–16]

Although there have been many calls for more systematic and evidence-based approaches to policy development,[5,6,17–21] missing from the literature is a clear articulation of the definition of evidence-based policy along with specific approaches that will enhance the use of evidence in policymaking.

TYPES OF EVIDENCE FOR EVIDENCE-BASED POLICY

Policy change involves both science and art and, therefore, evidence for policymaking can take several forms. The concept of evidence often originates from legal settings in Western soceties. In law, evidence comes in the form of stories, witness accounts, police testimony, expert opinions, and forensic science.[22] For policy-relevant evidence, both quantitative data (e.g., epidemiological) and qualitative information (e.g., narrative accounts) are important.

Although the use of research-derived evidence may be a key feature of most policy models,[7,9,23] it is not a certainty that scientific evidence will carry as much weight in "real world" policy-making settings as other types of evidence. Policymakers operate on a different hierarchy of evidence than scientists,[17] leaving the 2 groups to live in so-called parallel universes.[14] According to interviews with policymakers, many respondents reported that they were

TABLE 1—Barriers to Implementing Effective Public Health Policy

Barrier	Example
Lack of value placed on prevention	Only a small percentage of the annual US health care budget is allocated to population-wide approaches.
Insufficient evidence base	The scientific evidence on effectiveness of some interventions is lacking or the evidence is changing over time.
Mismatched time horizons	Election cycles, policy processes, and research time often do not match well.
Power of vested interests	Certain unhealthy interests (e.g., tobacco, asbestos) hold disproportionate influence.
Researchers isolated from the policy process	The lack of personal contact between researchers and policymakers can lead to lack of progress, and researchers do not see it as their responsibility to think through the policy implications of their work.
Policymaking process can be complex and messy	Evidence-based policy occurs in complex systems and social psychology suggests that decision-makers often rely on habit, stereotypes, and cultural norms for the vast majority of decisions.
Individuals in any one discipline may not understand the policymaking process as a whole	Transdisciplinary approaches are more likely to bring all of the necessary skills to the table.
Practitioners lack the skills to influence evidence-based policy	Much of the formal training in public health (e.g., masters of public health training) contains insufficient emphasis on policy-related competencies.

not trained to distinguish between good and bad data, and were, therefore, prone to the influence of misused "facts" often presented by interest groups.[24] Similarly, McDonough reported that in policy debates in state legislatures, data were used as "rhetorical weapons used to bolster competing values."[25(p210)] Because numbers exert a powerful and widespread influence on policy debates, they can lose their objective meaning.[26]

Quantitative Evidence

Quantitative evidence for policymaking (i.e., data in numerical quantities) can take many forms, ranging from scientific information in peer-reviewed journals, to data from public health surveillance systems, to evaluations of individual programs or policies.[27,28] Many consider the strongest evidence to be that from systematic reviews (e.g., the *Guide to Community Preventive Services*[29] or the Cochrane Reviews[30]), which sum up the results of primary scientific studies that meet explicit criteria (i.e., decision rules). Using data from reviews of public health laws, Moulton et al. searched the English language literature over the past 5 years. They identified 65 systematic reviews and found that of 52 public health laws, 27 were found effective, 23 had insufficient evidence to judge effectiveness, 1 was harmful, and 1 was found to be ineffective.[31] Yet single studies and evaluations are more commonly used to support policy than are systematic reviews,[32,33] in part because of the time and expense of conducting a systematic review or the insufficient number or quality of studies on a particular topic.

Other quantitative data can be collected from policymakers themselves to provide general guidance on policy approaches and strategic information on specific public health issues. For example, in a survey of 292 US state policymakers,[34] respondents expressed a strong preference for short, easy-to-digest data. Younger respondents were more likely to use electronic information than were older policymakers. The most trusted sources of information were those not having a stake in the outcome and those providing state-by-state comparisons. Surveys of policymakers can provide useful data on priorities and obstacles for specific health issues,[35,36] attitudes and voting intentions,[37] and perceptions of lobbyists and lobbying.[38]

Qualitative Evidence

Qualitative evidence involves nonnumerical observations, collected by methods such as participant observation, group interviews, or focus groups. Qualitative evidence can make use of the narrative form as a powerful means of influencing policy deliberations, setting priorities, and proposing policy solutions by telling persuasive stories that have an emotional hook and intuitive appeal. This often provides an anchor for statistical evidence, which, in turn, offers the powerful persuasive impact of the law of large numbers, in addition to being verifiable and having high credibility.[39] In studying the impact of evidence on policy to address health disparities, qualitative data, such as the effects of policy initiatives on children and families, has been persuasive and powerful in shaping the agenda.[40]

The incorporation of quantitative evidence within a compelling story can provide a powerful lever in the policy process. Studies from the communication field have examined the effectiveness of using statistical data versus stories for persuasion. These have shown that, although quantitative evidence alone more frequently has a stronger persuasive effect than qualitative evidence alone,[41] the combination of the 2 types of evidence appears to have a stronger persuasive impact than either type of evidence alone.[42]

POLICY SYSTEMS

Governmental policy systems vary widely in their structure and scope, ranging from totalitarian to democratic governments. We focused the descriptions of evidence-based policy on multicentric (democratic) governments.

Whether at a local, state, or federal level, the purpose of a representative body is to enact rules, laws, or ordinances that are in turn implemented by executive or administrative agents. We focused primarily on "big P" policies (e.g., formal laws, rules, regulations enacted by elected officials) as contrasted with "small p" policies (e.g., organizational guidelines, internal agency decisions or memoranda, social norms guiding behavior).[43,44]

Evidence-based policymaking has largely been an incremental progression.[45] For example, tobacco control advocates have long sought comprehensive restrictions on tobacco use, access, and secondhand smoke exposure. However, public policies on these topics were developed over decades. In 1987, the US House of Representatives banned smoking on domestic flights of 2 hours or less; in 1992, Congress passed the Synar Amendment[46] requiring states to adopt and enforce restrictions on tobacco sales to minors; in 1996, the US Food and Drug Administration published a final rule that restricted youth access to tobacco products (which was later overturned by the US Supreme Court)[47,48]; and in the past decade and a half, states and municipal governments have been extremely active in developing laws and regulations aimed at smoke-free worksites and public places.[49–51]

THREE DOMAINS OF EVIDENCE-BASED POLICY

We propose that evidence-based policy can be conceptualized as a continuum spanning 3 domains—process, content, and outcome (Table 2). Furthermore, as discussed earlier, there is no single, "best" type of evidence.

Policy Process

Recognizing and identifying key factors that inform the policy process is also critical to furthering evidence-based policy. Policymaking is complicated and the factors that inhibit or facilitate the process are equally complex.[17] There are very distinct stages or "streams" as Kingdon noted that, when coupled together, increase the odds of a policy being adopted. The first stream is the problem—agenda setting and how certain problems or conditions come to be regarded as problems worthy of governmental intervention. The second stream is policy—the alternative policy approaches that may be taken to address those problems.[4] The third stream, politics, recognizes those factors both inside and outside government that influence the policymaking process. Public policies must be not only "technically sound, but also politically and administratively feasible."[52(p311)]

Documenting influential political factors can comprise an evidence base for the process domain of evidence-based policy. Factors such as the national mood, organized political forces (e.g., interest groups, lobbyists), changes in governmental participants such as legislative or administrative turnover, jurisdictional boundaries or turf "wars" between governmental agencies, and the necessity of compromise or bargaining all affect the policy process.[4,53] According to numerous accounts, one of the reasons that health care reform legislation failed in the early to mid-1990s was a failure to understand the politics involved with policymaking.[4,53] Furthermore, the approach taken by the executive branch at the time was very much a rational, comprehensive approach to policymaking that sought to identify all of the possible alternatives, weigh the costs and benefits of each alternative, and choose the best approach among the alternatives. Proponents of that approach failed to learn from the lessons of past health care reform efforts, which indicated the need for an incremental approach to change rather than aiming for an all or nothing strategy.[4,53,54]

Many factors affect the policymaking process, including successful advocacy. In the study of social movements, progress hinges on the standing of those articulating an issue and the presence of a policy "sparkplug."[55,56] Case studies show that policy entrepreneurs or champions (i.e., leaders from professional, political, or interest groups who effectively advocate policy) have played key roles in policy reforms, including making major reforms in the historically intractable arena of Chicago, Illinois, public schools[57] and the rise of managed care as a dominating force

TABLE 2—Domains of Evidence-Based Public Health Policy

Domain	Objective	Data Sources	Example
Process	To understand approaches to enhance the likelihood of policy adoption	Key informant interviews Case studies Surveys of setting-specific political contexts	Understanding the lessons learned from different approaches and key players involved in state health reforms.
Content	To identify specific policy elements that are likely to be effective	Systematic reviews Content analyses	Developing model laws on tobacco that make use of decades of research on the impacts of policy on tobacco use.
Outcome	To document the potential impact of policy	Surveillance systems Natural experiments tracking policy-related endpoints	Tracking changes in rates of self-reported seat belt use in relation to the passage of seat belt laws. Describing the cost-effectiveness of child immunization requirements.

in the US health care system.[58] From the health policy field, several authors[20,59–62] describe successful examples of evidence-based advocacy and provide a guide for those who seek to move from research to advocacy. A strong partnership of researchers and advocates ensures that policies are grounded in science, so messages are tailored to the target audience, and models of persuasive communication (e.g., social marketing) are applied.

Policy Content

Policy content focuses on identifying the specific policy elements that are likely to be effective. As noted earlier, both quantitative and qualitative data can be used by policymakers to determine the appropriate policy intervention. Such information may be gleaned from systematic reviews and other scientific research including content analyses that offer an evidence base to inform decisionmaking.[29] For example, the Institute of Medicine has recognized that trans fatty acids (trans fats) do not provide any known health benefit and that they are linked to coronary heart disease.[63] One way to reduce or eliminate exposure to trans fats is to regulate their inclusion in food products.[64] As of August 2008, 7 US cities or counties had limited or restricted trans fats[65,66] and California is the first state to enact a law banning trans fats.[66]

We need to better understand and describe evidence-based elements within existing or proposed policy. For example, in examining 6.5 years of state legislation on physical education, Eyler[67] used systematic reviews and national standards to identify 4 specific bill components that are scientifically supported (i.e., minutes in physical education, physical education activity, teacher certification, and an environmental element including facilities and equipment).[68–70] Eyler conducted a content analysis and found that 28% of state laws had at least 1 evidence-based element yet only 0.5% had all 4 evidence-based elements.[67]

Policy Outcome

Documenting the effects of implemented policies (policy outcome) is equally important in supporting evidence-based policy. Policy evaluations are critical to the understanding of the impact of policies on community- and individual-level behavior changes. They should include "upstream" (e.g., presence of zoning policies supportive of physical activity), "midstream" (e.g., the enrollment in walking clubs), and "downstream" (e.g., the rate of physical activity) factors.[71] By far, the majority of quantitative measures are available for downstream outcomes.[71] One evaluation framework, the RE-AIM framework,[72] can be applied to evaluations of a policy and its impact.[73] RE-AIM has 5 dimensions: (1) reach (who or how many will be affected by the policy), (2) effectiveness (proximal or distal impacts and unintended consequences), (3) adoption (policy diffusion and participation level), (4) implementation (costs as well as enforcement and compliance), and (5) maintenance (institutionalizing the policy or program).

Policy evaluations may employ both qualitative and quantitative methodologies and may make use of "natural experiments" surrounding the adoption and implementation of the policy. These evaluations involve naturally occurring circumstances where different populations are exposed or not exposed to a potentially causal factor (e.g., a new policy) such that it resembles a true experiment in which study participants are assigned to exposed and unexposed groups. For example, scientific evidence led to the change in polio vaccination policy in the United States from that of an entirely oral poliovirus vaccine prior to 1997, to a schedule of inactivated poliovirus vaccine followed by oral poliovirus vaccine in 1997 through 1999, to a schedule of entirely inactivated poliovirus vaccine in 2000. When the policy changed from oral poliovirus vaccine only to inactivated poliovirus vaccine followed by oral poliovirus vaccine, the mean number of cases of vaccine-associated paralytic poliomyelitis declined by 54%. Since the conversion to an entirely inactivated poliovirus vaccine schedule in 2000, no cases of vaccine-associated paralytic poliomyelitis have been reported in the United States.[74]

Feedback Among the Domains

Making public policy is a continuous or recursive process that relies heavily upon scientific evidence and other influences (Figure 1).[75,76] Scientific evidence that examines the impact of public policies on systems and individual-level behavior change is one possible source of feedback. "Policy reinvention" is another step in the feedback loop—i.e., policies evolve as they diffuse.[77] The development and diffusion of smoke-free air laws in states and municipalities in the United States began with restricting smoking to designated areas, followed by restricting smoking to separately ventilated and separately enclosed areas, and, in the past several years, to complete bans on smoking.[50,51]

In addition, how the policy issue is framed is as important as the process and content. As Jewell and Bero recently noted, research-based evidence

> must be packaged to incite and persuade, to translate that knowledge into something that is understandable by the average legislator, average citizen.[24(p196)]

For example, efforts to ban or restrict the content of vending machines in schools did not mobilize until the issue was framed in a way such that vending machines were considered a vector for risk factors and behaviors that may be linked to obesity (such as the relationship between soft drink consumption and childhood overweight and obesity).[24] The feedback and framing processes are enhanced by partnerships among researchers, practitioners, and policymakers.

A WORKING DEFINITION TO MOVE THE DEBATE FORWARD

This short review of the nature of evidence-based policy sets the stage for 6 issues that will help in advancing the field, organized across the 3 domains of process, content, and outcome. Although the list that follows is not exhaustive, it involves the themes that we
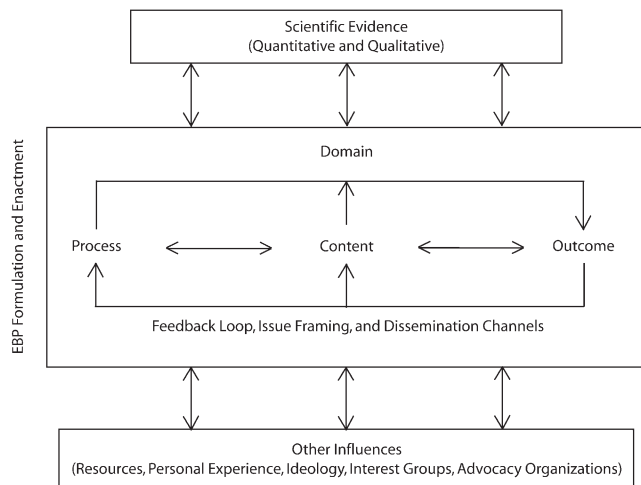
FIGURE 1—The interplay of factors influencing evidence-based public health policy.

believe are among the highest priorities. Building on our review and past literature,[32,33,78] we propose the following working definition: to improve public health outcomes, evidence-based policy is developed through a continuous process that uses the best available quantitative and qualitative evidence.

Process Issues

Prepare data for quick and proactive dissemination. Seneca, a philosopher in ancient Rome, noted that "luck is what happens when preparation meets opportunity."[79] This notion applies to modern-day policymaking. Luck and timing undoubtedly play important roles in policy success and we know that scientific studies are not always conducted at the right time to influence policy decisions.[80,81] For success in the process, one often needs to proactively analyze and assemble data so that evidence is ready when a policy window or opportunity emerges.[82,83]

Seek new ways of communicating data. Although it is well established that data can be powerful in shaping policy decisions,[84] they are sometimes not in the form most useful for policymakers.[85] One study of long-term care policymaking indicated "loud and clear, that academic-quality research is not reaching" policymakers.[86(p320)] For example, surveillance data often provide disease or risk factor data at the national or state level, yet these reports can be lengthy and are often lacking local-level data on health disparities.[87] Data need to be in a form that (1) shows public health burden, (2) demonstrates priority of an issue over many others, (3) shows relevance at the local (voting district) level, (4) shows benefits (or sometimes harms[88]) from an intervention, (5) personalizes an issue by telling a compelling story of how peoples' lives are affected,[14] and (6) estimates the cost of intervention. Such data need to be presented in short and concise formats (e.g., issue briefs) that directly address the issue that is being debated.

Content Issues

Identify the elements that lead to evidence-based policy. On the basis of credible evaluations, it is possible to sift apart the "active ingredients" of various policy interventions (i.e., the essential elements that contribute to effectiveness). Thus, the content of legislation can be developed based on the key elements that are likely to have the greatest public health impact, balancing effectiveness and population impact. This is the concept underpinning model legislation, yet even when model language exists, it is often lacking a scientific basis or has not been widely tested.[5]

Effectively use existing tools. A diverse and rich set of tools puts information at the fingertips to shape the content of evidence-based policy. These tools include meta-analysis, decision analysis, cost-effectiveness analysis, and simulation modeling; all are underutilized.[89,90] The existence of the tool alone is not enough; often training and technical assistance are needed to enhance uptake among potential users.

Outcome Issues

Develop systems for policy surveillance. To examine the adoption, implementation, and impact of evidence-based policy, we need systems in place to help us monitor patterns and trends in policies.[91–93] A few early efforts are underway to develop public health policy surveillance systems. For example, a group of federal and volunteer-based agencies have developed policy surveillance systems for tobacco, alcohol, and, more recently, school-based nutrition and physical education.[94–97]

Rely upon numerous forms of evidence for tracking outcomes. Evidence comes in numerous forms. It may be helpful to consider policy evidence in a typology rather than a hierarchy because adherence to a strict hierarchy of study designs may reinforce an "inverse evidence law" by which interventions most likely to influence whole populations (e.g., policy change) are least valued in an evidence matrix emphasizing randomized designs.[98,99] In addition, policy outcomes can be monitored with triangulated methods (accumulation of evidence from a variety of sources to gain insight into a particular topic, often combining quantitative and qualitative data) to understand content and track progress. Successful monitoring of outcomes will also require sources beyond the usual public health data sets (e.g., tax revenue data, polling data, marketing information).

CONCLUSION

Policy has had, and will continue to have, a vast impact on our daily lives and on public health indicators in part because of its long-term effects and relative low cost. Many of the public health programs now being implemented have a significant focus on policy

change. To improve these programs and to further evidence-based policy, we need to use the best available evidence and expand the role of researchers and practitioners to communicate evidence packaged appropriately for various policy audiences; to understand and engage all 3 streams (problem, policy, politics) to implement an evidence-based policy process; to develop content based on specific policy elements that are most likely to be effective; and to document outcomes to improve, expand, or terminate policy.

Governments spend significant sums on health-related research (about $30 billion annually in the United States) with the implied obligation that this investment will improve the health of the public. Better application of the tenets of evidence-based policy is likely to accelerate this improvement. ∎

About the Authors

Ross C. Brownson is with the Prevention Research Center in St Louis, the George Warren Brown School of Social Work, and the Department of Surgery and Alvin J. Siteman Cancer Center, School of Medicine, Washington University, St Louis. Jamie F. Chriqui is with the Health Policy Center, Institute for Health Research and Policy, University of Illinois, Chicago. Katherine A. Stamatakis is with the Department of Surgery and Alvin J. Siteman Cancer Center, School of Medicine, Washington University, St. Louis.

Correspondence should be sent to Ross C. Brownson, PhD, Washington University in St Louis, 660 S Euclid, Campus Box 8109, St Louis, MO 63110 (e-mail: rbrownson@wustl.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints/Eprints" link.

This article was accepted January 20, 2009.

Contributors

R. C. Brownson conceptualized the original project, led all phases, wrote sections of the article, and edited the entire article. J. F. Chriqui and K. A. Stamatakis helped to conceptualize ideas, wrote sections of the article, and reviewed and edited drafts of the article.

Human Participant Protection

No approval was required.

References

1. Centers for Disease Control and Prevention. Ten great public health achievements–United States, 1900-1999. *MMWR Morb Mortal Wkly Rep.* 1999;48:241–243.

2. Spasoff RA. *Epidemiologic Methods for Health Policy.* New York, NY: Oxford University Press; 1999.

3. Anderson JE. *Public Policymaking.* Boston, MA: Houghton Mifflin Company; 2006.

4. Kingdon JW. *Agendas, Alternatives, and Public Policies.* New York, NY: Addison-Wesley Educational Publishers Inc; 2003.

5. Hartsfield D, Moulton AD, McKie KL. A review of model public health laws. *Am J Public Health.* 2007;97(Suppl 1): S56–S61.

6. Black N. Evidence based policy: proceed with care. *BMJ.* 2001;323:275–279.

7. Rutten A, Luschen G, von Lengerke T, et al. Determinants of health policy impact: a theoretical framework for policy analysis. *Soz Praventivmed.* 2003;48: 293–300.

8. Davies H, Nutley S, Walter I. *Assessing the Impact of Social Science Research: Conceptual, Methodological and Practical Issues.* St Andrews, Scotland: Research Unit for Research Utilisation, School of Management, University of St Andrews; 2005.

9. Schmid T, Pratt M, Witmer L. A framework for physical activity policy research. *J Phys Activ Health.* 2006; 3(Suppl 1):S20–S29.

10. Weiss CH. Research for policy's sake: the enlightenment function of social research. *Policy Anal.* 1977;3:531–547.

11. Lomas J. Connecting research and policy. *ISUMA: Can J Policy Res.* 2000; 1:140–144.

12. Innvaer S, Vist G, Trommald M, Oxman A. Health policy-makers' perceptions of their use of evidence: a systematic review. *J Health Serv Res Policy.* 2002; 7:239–244.

13. Anderson LM, Brownson RC, Fullilove MT, et al. Evidence-based public health policy and practice: promises and limits. *Am J Prev Med.* 2005; 28(Suppl 5):226–230.

14. Brownson RC, Royer C, Ewing R, McBride TD. Researchers and policy-makers: travelers in parallel universes. *Am J Prev Med.* 2006;30:164–172.

15. McGinnis JM. Does proof matter? Why strong evidence sometimes yields weak action. *Am J Health Promot.* 2001; 15:391–396.

16. Terris M. Epidemiology as a guide to health policy. *Annu Rev Public Health.* 1980;1:323–344.

17. Choi BC, Pang T, Lin V, et al. Can scientists and policy makers work together? *J Epidemiol Community Health.* 2005;59:632–637.

18. Davis P, Howden-Chapman P. Translating research findings into health policy. *Soc Sci Med.* 1996;43:865–872.

19. Rychetnik L, Wise M. Advocating evidence-based health promotion: reflections and a way forward. *Health Promot Int.* 2004;19:247–257.

20. Friedlaender E, Winston F. Evidence based advocacy. *Inj Prev.* 2004; 10:324–326.

21. Steinberg EP, Luce BR. Evidence based? Caveat emptor! *Health Aff (Millwood).* 2005;24:80–92.

22. McQueen DV. Strengthening the evidence base for health promotion. *Health Promot Int.* 2001;16:261–268.

23. Tugwell P, Bennett KJ, Sackett DL, Haynes RB. The measurement iterative loop: a framework for the critical appraisal of need, benefits and costs of health interventions. *J Chronic Dis.* 1985;38:339–351.

24. Jewell CJ, Bero LA. "Developing good taste in evidence": facilitators of and hindrances to evidence-informed health policymaking in state government. *Milbank Q.* 2008;86:177–208.

25. McDonough JE. Using and misusing anecdote in policy making. *Health Aff (Millwood).* 2001;20:207–212.

26. Stone D. *Policy Paradox. The Art of Political Decision Making.* Rev ed. New York, NY: WW Norton & Co; 2002.

27. Brownson R, Fielding J, Maylahn C. Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health.* 2009;30:175–201.

28. Chambers D, Kerner J. Closing the gap between discovery and delivery. Presented at: Dissemination and Implementation Research Workshop: Harnessing Science to Maximize Health; March 26, 2007; Rockville, MD.

29. Zaza S, Briss PA, Harris KW, eds. *The Guide to Community Preventive Services: What Works to Promote Health?* New York, NY: Oxford University Press; 2005.

30. The Cochrane Collaboration. Available at: http://www.cochrane.org. Accessed September 4, 2008.

31. Moulton AD, Mercer SL, Popovic T, et al. The scientific basis for law as a public health tool. *Am J Public Health.* 2009;99:17–24.

32. Davies P, Newcomer K, Soydan H. Government as structural context for evaluation. In: Shaw I, Greene J, Mark M, eds. *The Sage Handbook of Evaluation.* Thousand Oaks, CA: Sage; 2006:163–183.

33. Segone M, ed. *Bridging the Gap. The Role of Monitoring and Evaluation in Evidence-Based Policy Making.* Geneva, Switzerland: UNICEF, the World Bank, and the International Development Evaluation Association; 2008.

34. Sorian R, Baugh T. Power of information: closing the gap between research and policy. When it comes to conveying complex information to busy policymakers, a picture is truly worth a thousand words. *Health Aff (Millwood).* 2002;21:264–273.

35. Davis JR, Kern TG, Perry MC, Brownson RC, Harmon RG. Survey of cancer control attitudes among Missouri state legislators. *Mo Med.* 1989;86:95–98.

36. DeRoeck D. The importance of engaging policy-makers at the outset to guide research on and introduction of vaccines: the use of policy-maker surveys. *J Health Popul Nutr.* 2004;22: 322–330.

37. Goldstein AO, Cohen JE, Flynn BS, et al. State legislators' attitudes and voting intentions toward tobacco control legislation. *Am J Public Health.* 1997;87:1197–1200.

38. Cohen JE, Goldstein AO, Flynn BS, et al. State legislators' perceptions of lobbyists and lobbying on tobacco control issues. *Tob Control.* 1997;6:332–336.

39. Lindsey LLM, Ah Yun K. Examining the persuasive effect of statistical messages: a test of mediating relationships. *Commun Stud.* 2003;54:306–321.

40. Whitehead M, Petticrew M, Graham H, Macintyre SJ, Bambra C, Egan M. Evidence for public health policy on inequalities: 2: assembling the evidence jigsaw. *J Epidemiol Community Health.* 2004;58:817–821.

41. Allen M, Preiss RW. Comparing the persuasiveness of narrative and statistical evidence using meta-analysis. *Commun Res Rep.* 1997;14:125–131.

42. Allen M, Bruflat R, Fucilla R, et al. Testing the persuasiveness of evidence: combining narrative and statistical forms. *Commun Res Rep.* 2000;17:331–336.

43. Milio N. Glossary: healthy public policy. *J Epidemiol Community Health.* 2001;55:622–623.

44. Schmid TL, Pratt M, Howze E. Policy as intervention: environmental and policy approaches to the prevention of cardiovascular disease. *Am J Public Health.* 1995;85:1207–1211.

45. Lindblom CE. The science of muddling through. *Public Adm Rev.* 1959;19(Spring):79–88.

46. Synar Amendment, Pub L No. 102–321, §1926 (1992).

47. *FDA v Brown & Williamson Tobacco Corp,* (98–1152); 0529 US 120 (2000).

48. US Food and Drug Administration. Regulations restricting the sale and distribution of cigarettes and smokeless tobacco to protect children and adolescents. *Final Rule.* 21 CFR §801 et seq. (1996).

49. Centers for Disease Control and Prevention. State smoking restrictions for private-sector worksites, restaurants, and bars–United States, 1998 and 2004. *MMWR Morb Mortal Wkly Rep.* 2005;54:649–653.

50. Centers for Disease Control and Prevention. State smoking restrictions for private-sector worksites, restaurants, and bars–United States, 2004 and 2007. *MMWR Morb Mortal Wkly Rep.* 2008;57:549–552.

51. Shelton DM, Alciati MH, Chang MM, et al. State laws on tobacco control—United States, 1995. *MMWR CDC Surveill Summ.* 1995;44(SS-6):1–28.

52. Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. *Annu Rev Public Health.* 2006;27:297–322.

53. Galvin R. The surprising optimist: why Tom Daschle believes that the country is ready for comprehensive health reform. Interview by Robert Galvin. *Health Aff (Millwood).* 2006;25:w26–w33.

54. Johnson H, Broder DS. *The System: The American Way of Politics at the Breaking Point.* Boston, MA: Little Brown and Company; 1996.

55. Benford RD, Snow DA. Framing processes and social movements: an overview and assessment. *Annu Rev Sociol.* 2000;26:611–639.

56. Economos CD, Brownson RC, DeAngelis MA, et al. What lessons have been learned from other attempts to guide social change? *Nutr Rev.* 2001;59(3 Pt 2):S40–S56;discussion S57–S65.

57. Lieberman JM. Three streams and four policy entrepreneurs converge: a policy window opens. *Educ Urban Soc.* 2002;34:438–450.

58. Oliver TR. Policy entrepreneurship in the Social Transformation of American Medicine: the rise of managed care and managed competition. *J Health Polit Policy Law.* 2004;29(4–5):701–733; discussion 1005–1019.

59. Carlisle S. Health promotion, advocacy and health inequalities: a conceptual framework. *Health Promot Int.* 2000;15:369–376.

60. Chapman S, Lupton D. *The Fight for Public Health. Principles and Practice of Media Advocacy.* London, UK: BMJ Publishing Group; 1994.

61. Wallack L, Dorfman L, Jernigan D, Themba M. *Media Advocacy and Public Health: Power for Prevention.* Newbury Park, CA: Sage; 1993.

62. Selig WK, Jenkins KL, Reynolds SL, Benson D, Daven M. Examining advocacy and comprehensive cancer control. *Cancer Causes Control.* 2005;16(Suppl 1):61–68.

63. Institute of Medicine. Carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids. In: *Dietary Reference Intakes for Energy.* Washington, DC: The National Academies Press; 2002.

64. Gostin LO. Law as a tool to facilitate healthier lifestyles and prevent obesity. *JAMA.* 2007;297:87–90.

65. National Conference of State Legislatures. Trans fat and menu labeling legislation. Available at: http://www.ncsl.org/programs/health/transfatmenulabelingbills.htm. Accessed August 20, 2008.

66. Steinhauer J. California bars restaurant use of trans fats. *New York Times.* July 26, 2008. Available at: http://www.nytimes.com/2008/07/26/us/26fats.html?emc=rss&partner=rssnyt. Accessed March 9, 2009.

67. Eyler A. How common is evidence-based state physical education legislation? Paper presented at: Prevention Research Centers Annual Program Meeting; March 26, 2008; Atlanta, GA.

68. Hoehner CM, Soares J, Perez DP, et al. Physical activity interventions in Latin America: a systematic review. *Am J Prev Med.* 2008;34:224–233.

69. Kahn EB, Ramsey LT, Brownson RC, et al. The effectiveness of interventions to increase physical activity. A systematic review. *Am J Prev Med.* 2002;22(4 Suppl):73–107.

70. National Association for Sport and Physical Education. *Moving Into the Future: National Standards for Physical Education.* Reston, VA: McGraw-Hill; 2004.

71. McKinlay JB. Paradigmatic obstacles to improving the health of populations—implications for health policy. *Salud Publica Mex.* 1998;40:369–379.

72. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *Am J Public Health.* 1999;89:1322–1327.

73. Jilcott S, Ammerman A, Sommers J, Glasgow RE. Applying the RE-AIM framework to assess the public health impact of policy change. *Ann Behav Med.* 2007;34:105–114.

74. Alexander LN, Seward JF, Santibanez TA, et al. Vaccine policy changes and epidemiology of poliomyelitis in the United States. *JAMA.* 2004;292:1696–1701.

75. Green LW. Public health asks of systems science: to advance our evidence-based practice, can you help us get more practice-based evidence? *Am J Public Health.* 2006;96:406–409.

76. Sterman JD. Learning from evidence in a complex world. *Am J Public Health.* 2006;96:505–514.

77. Hays SP. Patterns of reinvention. *Policy Stud J.* 1996;24:551–566.

78. Kohatsu ND, Robinson JG, Torner JC. Evidence-based public health: an evolving concept. *Am J Prev Med.* 2004;27:417–421.

79. Seneca quotes. Available at: http://thinkexist.com/quotes/seneca/2.html. Accessed June 22, 2009.

80. Foltz AM. Epidemiology and health policy: science and its limits. *J Ambul Care Manage.* 1986;9:75–87.

81. Foxman B. Epidemiologists and public health policy. *J Clin Epidemiol.* 1989;42:1107–1109.

82. Greenlick MR, Goldberg B, Lopes P, Tallon J. Health policy roundtable—view from the state legislature: translating research into policy. *Health Serv Res.* 2005;40:337–346.

83. Huston AC. From research to policy and back. *Child Dev.* 2008;79:1–12.

84. Fielding JE, Frieden TR. Local knowledge to enable local action. *Am J Prev Med.* 2004;27:183–184.

85. McBride T, Coburn A, Mackinney C, Mueller K, Slifkin R, Wakefield M. Bridging health research and policy: effective dissemination strategies. *J Public Health Manag Pract.* 2008;14:150–154.

86. Feldman PH, Nadash P, Gursen M. Improving communication between researchers and policy makers in long-term care: or, researchers are from Mars; policy makers are from Venus. *Gerontologist.* 2001;41:312–321.

87. Gold M, Dodd AH, Neuman M. Availability of data to measure disparities in leading health indicators at the state and local levels. *J Public Health Manag Pract.* 2008;14(Suppl):S36–S44.

88. Freudenberg N, Bradley SP, Serrano M. Public health campaigns to change industry practices that damage health: an analysis of 12 case studies [published online ahead of print December 12, 2007]. *Health Educ Behav.* 2009;36(2):230–249.

89. Colditz GA, Emmons KM, Vishwanath K, Kerner JF. Translating science to practice: community and academic perspectives. *J Public Health Manag Pract.* 2008;14:144–149.

90. Kerner JF, Guirguis-Blake J, Hennessy KD, et al. Translating research into improved outcomes in comprehensive

cancer control. *Cancer Causes Control.* 2005;16(Suppl 1):27–40.

91. Committee on Prevention of Obesity in Children and Youth. *Preventing Childhood Obesity. Health in the Balance.* Washington, DC: The National Academies Press; 2004.

92. McGowan A, Schooley M, Narvasa H, Rankin J, Sosin DM. Symposium on public health law surveillance: the nexus of information technology and public health law. *J Law Med Ethics.* 2003; 31(4 Suppl):41–42.

93. Spangler KJ, Caldwell LL. The implications of public policy related to parks, recreation, and public health: a focus on physical activity. *J Phys Act Health.* 2007;4(Suppl 1):S64–S71.

94. Chriqui JF, Frosh MM, Brownson RC, et al. *Measuring Policy and Legislative Change. Evaluating ASSIST: A Blueprint for Understanding State-Level Tobacco Control.* Bethesda, MD: National Cancer Institute; 2006.

95. Masse LC, Chriqui JF, Igoe JF, et al. Development of a Physical Education-Related State Policy Classification System (PERSPCS). *Am J Prev Med.* 2007; 33(4 Suppl):S264–S276.

96. Masse LC, Frosh MM, Chriqui JF, et al. Development of a School Nutrition-Environment State Policy Classification System (SNESPCS). *Am J Prev Med.* 2007;33(4 Suppl):S277–S291.

97. National Institute on Alcohol Abuse and Alcoholism. Alcohol Policy Information System. Available at: http:// alcoholpolicy.niaaa.nih.gov. Accessed August 31, 2008.

98. Nutbeam D. How does evidence influence public health policy? Tackling health inequalities in England. *Health Promot J Aust.* 2003;14:154–158.

99. Ogilvie D, Egan M, Hamilton V, Petticrew M. Systematic reviews of health effects of social interventions: 2. Best available evidence: how low should you go? *J Epidemiol Community Health.* 2005;59:886–892.

An Account of Collective Actions in Public Health

| Gil Siegal, MD, LLB, SJD, Neomi Siegal, MD, MPH, MHA, and Richard J. Bonnie, LLB

Aggregated health decisions by individuals are of paramount importance to public health professionals and policymakers, especially in situations where collective participation is a prerequisite for achieving an important public health goal such as herd immunity. In such circumstances, concerted action often falls short of the common good through lack of sufficient participation.

Collective action problems are traditionally attributed to rational egoists seeking to promote their interests and enjoy a ''free ride.'' We call attention, however, to the behavioral features of collective action and their implications for solving public health policy problems. (*Am J Public Health.* 2009; 99:1583–1587. doi:10.2105/ AJPH.2008.152629)

SOLUTIONS TO MANY OF THE problems confronted by public health policymakers depend on getting people to behave in a way that promotes the common interest even though the desired conduct may not serve the self-interest of each individual. If individuals make choices that undermine a public good, society faces the choice of either giving up the desired public good or finding a way to influence individual decision-making to guarantee a sufficient level of cooperation. Economists characterize these challenges as collective action problems (alternative terms in use include "social dilemmas," "shirking," the "free-rider problem," "moral hazard," and the "N-person prisoner's dilemma"). We argue that framing common challenges in public health as collective action problems would help policy planners by allowing them to draw on a large body of literature and insights in behavioral and social sciences that have not yet been incorporated into the mainstream of the field.

The traditional economic account of collective action problems stems from the premise that suboptimal participation in collective efforts to create and preserve public goods, such as a clean environment, is a direct result of rational decisions made by individuals to advance their own interests over those of the group, often while consuming the benefits of investments made by others. Emerging scholarship in the behavioral and social sciences, however, sheds new light on the choices that people make,[1–3] and especially on what is ostensibly free-riding behavior, leading to the general conclusion that failures to create and sustain public goods are often attributable to cognitive and behavioral tendencies that can be modified. These insights should be harnessed within the field of public health policy to help us understand how to reduce the number of people who shirk responsibilities to larger groups.[4] Importantly, these studies lead to the conclusion that collective action problems are often imperfectly conceptualized as simple free-rider problems. This developing body of knowledge also highlights the more complex composition of collective action problems.

We analyze several public health issues using an enriched framework of collective action problems to illustrate its advantages in prescribing public policies. In planning for solving collective action problems in public health, we advocate a more prominent incorporation of behavioral components. Interestingly, the literatures in medicine and public health have thus far given little attention to collective action problems in many situations that would fit well with the body of knowledge gained in the fields of behavioral law and economics. We also believe that lessons learned in resolving collective action problems in biomedicine could foster a more general discussion of the obligations of citizenship and of individual as well as communal responsibilities, but space limitations preclude a more detailed exposition of this thesis here.[5,6]

We use 2 case studies: one regarding vaccination, an archetypal